



Specification · Feature	CD160 Jr	CD160	CD160-5 (CD160-5A)	CD160L (CD160LA)	CD160L-5 (CD160L-5A)
Frequency	1.8 ~ 1.9MHz	1.8 - 1.9 MHz	1.8 - 1.9 MHz	1.8 - 1.9 MHz	1.8 - 1.9 MHz
Gain: Free Space/1.8MHz.	-3dBi	-1.5dBi	-0.3dBi	-0.3dBi	0.5dBi
Impedance (Connector)	50 Ω (-M-)	50 Ω(-M-)	50 Ω(-N-)	50 Ω(-M-)	50 Ω(-N-)
VSWR (at the best point)	Less than 1.3	Less than 1.3	Less than 1.3	Less than 1.3	Less than 1.3
Power CW (Duty 50%) / PEP	30W/100W	1kW/2kW	5kW/10kW	2kW/4kW	5kW/10kW
Element Length Nominal	17.2 m	19.9 m	21.6 m	25.8 m	25.8 m
Weight	12 kg	18 kg	21 kg	31 kg	35 kg
Mast Diameter	φ 48 ~ 61 mm	φ 48 ~ 61 mm	φ 48 ~ 61 mm	φ 48 ~ 61 mm	φ 48 ~ 61 mm
Survival Wind Speed	35 m/s	35 m/s	35 m/s	35 m/s	35 m/s
Wind Surface Area, Wind Load (35m/s)	0.5m <sup>2</sup> , 46kgf	0.68m <sup>2</sup> , 62kgf	0.72m <sup>2</sup> , 66kgf	0.95m <sup>2</sup> , 87kgf	1.0m <sup>2</sup> , 92kgf

Models indicated in ( ) 3-CH type for 1.8MHz only.  
CMN-1612

**CD160Jr** : This is a model for receiving purpose, and is the most compact type among this series. Those who uses vertical polarized type of antenna for both receiving and transmission but wish to receive horizontally would meet the demands. Although 1-CH type ATU is equipped in the feed section, a sufficient receiving sensitivity across the entire bandwidth would be assured.

**CD160** : This is a antenna that the size of element is minimum limited that allows to operate in a practical way. Making further reducing the scale type is possible, but operability deteriorates due to narrower bandwidth maintaining stable VSWR, drawback a drift of frequency etc. The gain of this antenna is approx. -3.5dB in comparison with that of a full-size dipole however, far have a superiority to those of inverted V antenna can offers.

**CD160-5** : This is a model that updated CD160 durable to higher power input, and is advantageous in terms of its gain and frequency-drift. As a high-powerizing of a antenna needs inevitably large high Q loading coil, this lets inevitably narrow-band-ability of VSWR characteristics, hence provides 1.8:1 VSWR with 5kHz bandwidth per 1-CH. The model comes with element-guy kit.

**CD160L** : This is a longer element type of CD160 offers higher specification enhanced to gain, VSWR characteristic, and frequency-drift as well. This is a longer element type of dipole progressed from CD160 offers several enhancements, gain, VSWR characteristic, and restraining against frequency-drift as well. An element-guy kit is included .

**CD160L-5** : This CD160L-5 is a high power type model modified from model CD160L. Except power durability, the electric specification is the same as that of CD160L and CD160-5. The bandwidth per 1-CH is 5kHz maintaining VSWR around 1.5:1. The antenna includes element-guy kit.

**CD160xA** : Those models, under model number CD160xA are a low cost, ATU type antenna designed for 1.8MHz only. Those who operate on 1.8MHz only could meet the requirement. It allows to operate 1.9MHz by a replacement of ATU which is available as an option.

#### A MERIT OF ROTATABLE HORIZONTAL DIPOLE

Although it might be of advantage that those vertically-polarized radiational antennas radiating at low take-off angle can offer is ideal for DX communication, and prone to consider that those vertical polarized antennas are better than a horizontal antennas, particularly for the communication in low bands. However, vertical antennas have less ground-reflection, and the gain at maximum radiation angle is greatly dropped down. Fig. A shows the radiation pattern of both horizontal plane and vertical plane when CD160L is installed on 30m above the ground. In the take-off angle at above 30° however, the gain of horizontal type antenna have precedence over vertical polarized antenna, while surpass slightly when the angle is below in vertical polarized antennas. Generally however, propagation that transmitted RF wave is reached to other side inevitably involves ground reflection by means of ionospherically bounds, horizontal polarized antennas are of advantage ahead and are ideal for their higher effective reflection-ability. With being "oval" shape radiation pattern that horizontal polarized antenna is innate, could bring a merit by rotating it with use of a rotator than non-directional antennas in terms of S/N ratio. Although it refers to 1dB higher gain than CD160L at maximum take-off angle in a full-sized inverted V DP antenna at V-angle setting at 100 degree on the height of 30m above the ground, CD160 surpass it when setting is less than 20 degree.

—— Horizontal GAIN: 4.7dBi Free Space GAIN: -0.3dBi  
 - - - - - Vertical GAIN: -1.3dBi Height: 30m

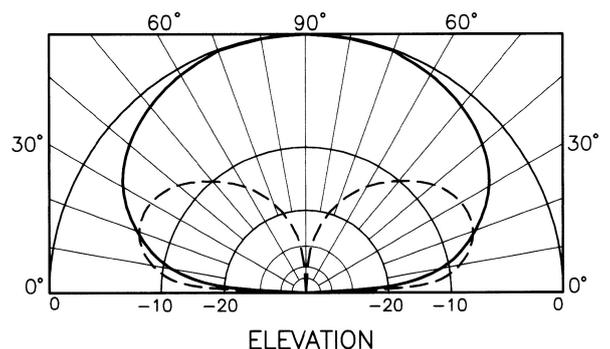


Figure A. CD160L, Radiation Pattern of Reduced Dipole



# Low-Band Antenna **CD160, CD78, CV48**

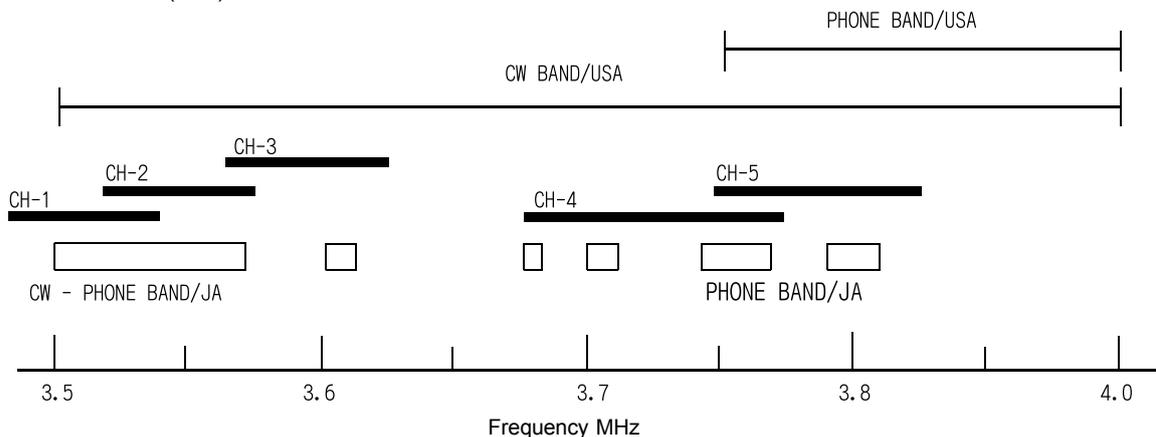
☆ High Efficient · Rotatable Dipole Antenna **CD160, CD78-Series**

☆ Reduced Element Length · Low Take-Off Angle · Vertical Antenna **CV48**



● The CD78-series is a relay controlled, fractional reduced-scaled type of rotary dipole antenna for the operation of 3.5/3.8MHz bands. By applying with a newly developed a High Q loading coil and power durability and capacity hat, it makes it possible to offer high radiation efficiency. Each model comes with 5-CH tune coupler BS81C standard. A 13.8V DC power supply for band switching and control cable of 6-conduct is required (customer furnished).

- CD78Jr** ... With configuring of element length at 11.9m (of 28~30% mechanical length of full-sized length) and adopting a high radiation efficient Alnoweld T-hat element offers an extreme compactness, yet assure approximate -2dB radiation efficiency that is virtually close to that of a full-sized type. The bandwidth per 1-CH is approximately 30kHz (at where VSWR is less than 2:1). A V-shaped element type, model CD78Jr-V that is smaller half rotational radius for enabling to install it under such a space-limited environment, hence is less affected from the ground (low height), surrounded metallic object etc, is also available.
- CD78** ... Owing to 17m long element length (of 42~45% mechanical length of a full-sized antenna), it can assure to offer approx -2.0dB radiation efficiency, presenting approximately 40kHz bandwidth per 1-CH. metallic object A 5kW higher power type of this antenna is also available.
- CD78L** ... Having longest element length as long as 24m (of 55~60% mechanical length of a full-sized antenna) in this series, it can assure to offer approximately -0.6dB radiation efficiency. As the bandwidth per 1-CH obtainable is approximately 80~100kHz, hence it can operate entire bands of 3.5 and 3.8MHz assigned (in the conformity with JARL band plan as of Nov. 2011) by switching 5-CH coupler. As similar to CD78, a higher power type of this antenna (5kW) is also available.



5-CH Coupler, Operation Channel (CD78-L Typical, Bandwidth at VSWR Less Than 2:1)

● CV48 is a reduced type vertical antenna for 3.5MHz (when matching tuner AD385 is attached) and 3.8/7MHz (full-sized on 7MHz) bands. A specially structured trap and loading capacitor makes it possible to derive 7MHz operation almost to a full-sized antenna, while works as a reduced scaled antenna of 65% mechanical length of radiator on 3.8MHz. It provides vertical polarization with high radiation efficiency, power durability and low take-off angle (radial required.)

● CD160 is a reduced scaled rotatory dipole antenna of having entire length only at 19.9m long for the operation on 1.8/1.9MHz band. A relay controlled 4-CH coupler enables to switch the band, allowing a swift band-switching (by dividing 1.8MHz band into 3-CH maintaining 15kHz bandwidth per CH in 5kHz step, while the assigned 5kHz on 1.9MHz band in 1-CH). It covers the entire band of the 160m band. Applying Alnoweld 'T-Hat' element and ventilating type large diameter of loading coil complete this antenna providing with high radiation efficiency with minimum loss. This model comes with 4-CH coupler BS83 (A 13.8VDC power supply and control cable of 4-conductor are required.)

Model	CD160	CD78Jr (-H)	CD78 (-5)	CD78L (-5)	CV48
Frequency (MHz)	1.8 / 1.9	3.5 / 3.8	3.5 / 3.8	3.5 / 3.8	3.8/7
No. of Element	—	—	—	—	—
Forward Gain (dBi)	-1.5	0	0	1.5	3 / 4.5
F / B Ratio (dB)		—	—	—	—
Power Capability (PEP/kW)	2	1.2(2) / 2(2)	2 (5)	3 (5)	
Boom Length (m)	—	—	—	—	—
Element Length (m)	19.9	11.9	17.0 (18.0)	24.0 (24.4)	12.1
Rotational Radius (m)	9.95	6.0	8.5 (9.0)	12.0 (12.2)	—
Mast Diameter (mm)	48 ~ 61	48 ~ 61	48 ~ 61	48 ~ 61	48 ~ 61
Wind Surface Area (m <sup>2</sup> )	0.7	0.4	0.7	1.0	0.3
Control Cable (13.8VDC)	4-Core	6-Core	6-Core	6-Core	—
Weight (kg)	18.0	8.0	12.0 (13.0)	22.0 (23.0)	11.0
Recommended Rotator	RC5-x	RC5-x	RC5-x	RC5A-x	—

- ★ CD78-Series include balun (inside BS81), Connector Type -M-                      ★ Wind Survival Rate 35m/s or Above
- ★ CD78Jr-V (Rotational Radius 4.6m, Rest of the specification is the same as CD78Jr)
- ★ High Power Type Available

● Option: V-Clamp Kit for CD78Jr  
 AD385, 3.5MHz Matching Adaptor for CV48 (A 13.8VDC power supply and control cable of 2-conductor is required.)

# HF V-Dipole

High Radiation Efficiency, Horizontal Polarization  
Easy Construction, Compact, Insensitive to Ambient Condition



730V-1 (7/14/21/28MHz)

Model	730V-1 (730V-1A)	730V-2 (730V-2A)	830V-1 (830V-1A)
Frequency (MHz)	7/14/21/28 (HF+50)	7/21/28 (HF+50)	10/18/24 (HF+50)
Power Capability (PEP/kW)	1/2/2/2	0.6/2/2	3/3/3
Element Length (m)	11.6	8.6	10
Rotational Radius (m)	4.1/90°	3.0/90°	4.5/130°
Mast Diameter (mm)	42~61	42~61	42~61
Weight (kg)	5.5	4.5	5.0

- ★ All the models include balun that connector attached is type -M-. Power capability on 50 MHz is 1 kW input.
- ★ 50 MHz kit, 786C is optionally available (for upgrade for 730V-x, 830V-x)

Model 730V-x series is a compact V-type 4(3)-band dipole antenna with a figure 8-directivity pattern and is horizontally polarized. The shortest possible elements are used while still providing high radiation efficiency and broad band VSWR characteristics. The use of the V shape reduces the area needed for mounting the antenna and is insensitive to changes in height above the ground and surrounding metallic objects. These features allow the antenna to be installed at almost any site. The antenna is operable at a height of 2 - 3m or six or more feet above the ground. Due to the horizontal polarization and figure 8 pattern, the 730V-x is superior to the usual compact ground plane antenna, especially in respect to gain and TVI. A high quality balun is included as a standard component of this high performing antenna. Model 730V-xA is the model that 50MHz is added to the standard type of 730V-x. In the meanwhile model 830V-1 (830V-1A) is a V-dipole antenna for WARC band operation of the frequency 10/18/24/50 MHz) respectively.

# 730V-xW, V-Dipole Antenna for 7MHz Expanded Band

V-Dipole Antenna with BS41 Matching Tuner for 7MHz Expanded Band  
Remotely Operate 4-Band Switching Enables to Cover the Expanded-Band on 7MHz  
by Remotely Controlling 4-Band Switcher

730V-1W (7, 14, 21, 28MHz)

730V-1AW (7, 14, 21, 28, 50MHz)

Power handling is the same as that of standard model 730V-1x.

730V-2W (7, 21, 28MHz)

730V-2AW (7, 21, 28, 50MHz)

Power handling is the same as that of standard model 730V-2x.



BS41. It builds in matching circuit and balun transformer.

4-Band Remote Switch  
(Supplied As An Assembly Kit)

This new type V-Dipole antenna both 730V-1W and 730V-2W makes it possible to operate not only on the bands existing so far but also newly assigned the expanded-band on 7MHz.

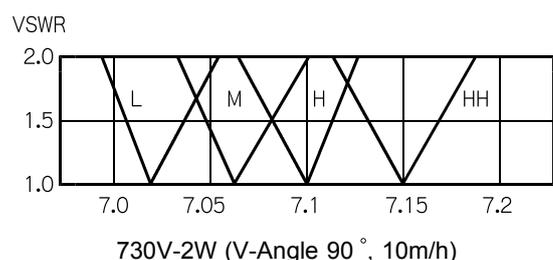
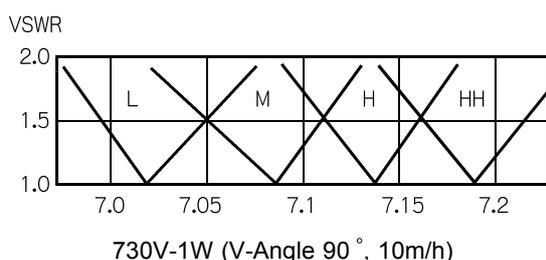
(For band switching, a 13.8VDC power supply and a remote cable of 4-conductors are required.)

Other than 7MHz, it contributes also to improve to maintain lower VSWR on other frequencies band that 730V-series allows. By conducting the band switching, it makes it possible to resonance the antenna tuning in more precisely, those higher frequencies in the ham band assigned for SSB, FM band etc.

Ex: At the best VSWR point on 14MHz of 730V-1W, operational frequency range expands from 14.15 up to 14.35MHz.  
At the best VSWR point on 28MHz of 730V-2W, operational frequency range expands from 28.5 up to 29.0MHz.

As being the fact, taking the recent case in Japan, for example, the rules and regulations has been revised to be able to operate 7.060 ~7.140MHz for the PHONE (either AM or SSB) operation in All JA Contest as of 2010. In coupled with the band expansion, needing such an antenna 'ready-for-operation' will help a lot to meet the requests. The same is true of those applications and enthusiasts, seeking for wider bandwidth of operation in upper side of frequencies, for contest, DX-hunting, by determining to band selecting and switching the antenna swiftly into a preferable frequency desired, and quick contacting friends, rag-chewing with a favorite group or party avoiding an unwilling noise and QRM, hence the 730V-1W, 730V-2W will meet the requests.

## VSWR for 7MHz (Typical)



- Those users who have already owned either 730V-1x or 730V-2x, the antenna tuner BS41 expanded kit for 7MHz band is only required. Except slight readjustment in tip element, no particular modification on the antenna itself is required as no electrical affection is given by attaching this unit.

## **BS41, Matching Tuner for 7MHz Expanded Band for 730V Series**

This BS41 is a matching tuner designed for the existing 730V-series enable to operate the newly assigned expanded band on 7MHz. By attaching this unit to the model 730V-1x allows to expand the bandwidth on 7MHz. (No modification is required in the antenna.)

Attaching this unit brings to helps the VSWR improvement for the other band other than 7MHz too. The VSWR characteristic for those higher bands (assigned for SSB, FM bands) tend to obtain a better VSWR.

Ex: 14MHz of 730V-1 enables to cover 14.15 ~ 14.35MHz bandwidth at the best VSWR point.  
28MHz of 730V-2 enables to cover 28.5 ~ 29.0MHz bandwidth at the best VSWR point.

Not only those who owns the existing 730V-series for expanding it for 7MHz, but also those who wish to set up V-dipole seeking to operate on the newly assigned expanded frequencies on the 7MHz together, such as Contest lovers, DX-huntings, rag-chewing with friends, meeting QSO group or party on the air, this antenna meets the demands and is indispensable.

For the details for the BS41, refer to the page for 730V-xW.